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(57) Abstract

A skylight assembly (1) including a subsidiary source (6) of artificial illumination in the form of a lamp, light bulb or the light disposed with a light shaft (4) extending from roof (10) to ceiling (11) of a given structure, the subsidiary light source to be operable on demand, as for example in the night hours or on days of adverse weather conditions, when natural lighting is reduced. The light source (6) is powered by solar cells or batteries (5) appropriately disposed on the roof (10) of the structure.

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IMPROVEMENTS IN SKYLIGHTS

The present invention relates, in general terms, to improvements in lighting means. More particularly, but not exclusively, the present invention relates to an improved form of skylight arrangement intended for usage in the illumination, in a cost-effective manner, of internal areas of a house, office or the like establishment.

In any building, whether for domestic or commercial use, there invariably exist areas which require lighting or illumination on an irregular basis. By way of example only, bathrooms, en-suites or the like are not areas or rooms which require illumination over long periods of time, being rooms which at best enjoy irregular usage. In like manner so-called walk-in wardrobes, pantries, etc. of the type currently in vogue in modern-day constructions, also require to be lit only at irregular intervals. Under such circumstances it does seem somewhat wasteful to have a conventional light source associated with such rooms or areas.

The present invention seeks to resolve this problem by providing a form of illumination for such areas which functions only on demand and which does not rely on connection to the normal power or electrical grid for its operation. To be more specific, the invention seeks to provide an arrangement which, during daylight hours, is subject to natural lighting but which, in the hours of darkness, is illuminated without the necessity of connection to the normal electricity or power supply of the building or the like structure.

In accordance with the present invention, therefore, there is provided a skylight assembly for installation in a building or the like structure to enhance internal illumination thereof, said assembly including: a first unit adapted to be installed, in a substantially weatherproof manner, in a roof of said building or the like structure; a second unit adapted to be installed, internally of said roof, in a ceiling or the like of said building; shaft means extending between said first and second units to allow for transmission of light to an internal area of said building or the like structure; and a subsidiary

illuminating means for the provision on demand of artificial light or illumination to said internal area.

In order that the invention may be more clearly understood and put into practical effect reference will now be made to an especially preferred embodiment of a lighting means in accordance with the invention. The ensuing description is given by way of non-limitative example only and is with reference to the accompanying drawings, wherein:

FIG. 1 illustrates, in side elevation, a portion of a house or the like structure including a lighting means or skylight structure in accordance with the present invention;

FIG. 2 is a view of a flexible skylight arrangement in accordance with the invention; and

FIG. 3 is a side view of the dome and associated lighting means, in position on the roof of a building or the like structure.

In the embodiment illustrated a lighting means (skylight) in accordance with the present invention is generally designated 1. Such basically includes a roof unit 2, preferably in the form of a dome-shaped structure of any suitable material adapted to be disposed in any known manner on or in the roof 10 of the establishment concerned, a ceiling unit member 3 adapted to be disposed, again in any known manner, in or through the internal ceiling 11 of the building of the like structure, and a shaft means 4 extending between the roof unit 2 and the ceiling unit 3. The roof unit 2 and the ceiling unit 3 can be of any known type, and can be either transparent or opaque. In practice the dome unit may be varied as required to best suit different types of roofs, for example tiled roofs, corrugated roofs, pitched roofs, steel decking roofs, etc.

The shaft means 4 can be of either a rigid or a flexible construction, dependent upon the need therefor. In a practical sense the cross-sectional shape of the shaft means 4 is not of the essence of the invention, but such a shape would preferably be circular, oval or perhaps rectangular. When the shaft means 4 is constructed of substantially rigid material, then the material employed may be timber with a layer of a light reflective material disposed internally

thereof. Alternatively, when the shaft means 4 is constructed of a flexible material, such material will preferably be formed of at least two plies, namely an outer ply of a plastics material and an inner ply of a light-reflective metal foil material, as for example aluminium. In yet an alternative embodiment the inner ply could also be constructed principally of plastics material, with its inner surface made highly light-reflective, as for example by being aluminised in any known manner. In yet an alternative embodiment the outer ply could also be constructed of metal or the like material.

The arrangement in accordance with the present invention also includes a solar cell, battery or the like unit 5 adapted to be disposed at the upper end thereof for exposure to sunlight. That solar cell or the like unit 5 will be in electrical connection with a light source 6 of any known type disposed within the shaft means 4 of the overall skylight 1, preferably at or in the vicinity of the ceiling 11 or, as illustrated in FIGS. 2 and 3, at or in the vicinity of the roof 10. The arrangement will be such that, during sunlight hours, the solar cell 5 will function to store energy for subsequent use, or use on demand.

In an especially preferred embodiment, not shown, the arrangement in accordance with the present invention may include a switch of any known type to allow for actuation of the light source 6 as desired. In an alternative embodiment a movement sensitive or heat-sensitive means of any known type may be incorporated for purposes of actuation of the light source 6.

The principle of operation of the arrangement in accordance with the present invention is that, during sunlight or daylight hours, the overall skylight arrangement 1 will function to allow for illumination of the relevant room or space without there being any need for actuation of the included light source or illumination means 6. However, once darkness arrives then the stored-up energy of the solar cell 5 can be employed for purposes of lighting on demand. Since the skylight arrangement 1 in accordance with the present invention is primarily to be employed in areas which require lighting on an irregular basis, then a solar cell of the type under

consideration should over any given daylight period store up sufficient energy to operate the light source 6 during the hours of darkness.

In a further preferred embodiment, and this with reference to FIG. 3 in particular, the roof dome unit 2 can be either vented or unvented, thereby if desired and if vented to allow the skylight arrangement 1 to also act as a ventilation means.

The arrangement in accordance with the present invention can therefore be seen to afford a number of practical advantages. First of all it allows for natural illumination of a given space during sunlight or daylight hours. Secondly it allows for illumination of that same area or space during hours of darkness without expenditure of electrical power from the electrical grid. It can therefore be seen that the arrangement in accordance with the present invention affords cheap and ready illumination for any given area.

The arrangement in accordance with the present invention illustrates a further advantage over the known art by virtue of its being available in kit form, for installation even by the home handyman without the need for access to complicated and/or expensive tooling or skilled assistance in terms of electricians, etc.

In closing it should be realised that the aforegoing description refers merely to preferred embodiments of the invention and that variations and modifications will be possible thereto without departing from the spirit and scope of the invention, the ambit of which is to be determined from the following claims.

CLAIMS

1. A skylight assembly for installation in a building or the like structure to enhance internal illumination thereof, said assembly including: a first unit adapted to be installed, in a substantially weatherproof manner, in a roof of said building or the like structure; a second unit adapted to be installed, internally of said roof, in a ceiling or the like of said building; shaft means extending between said first and second units to allow for transmission of light to an internal area of said building or the like structure; and a subsidiary illuminating means for the provision on demand of artificial light or illumination to said internal area.

2. The skylight assembly as claimed in claim 1, wherein said first unit is a roof-installed closure for a light-transmitting opening provided in said roof, said closure being formed of a transparent or opaque material.

3. The skylight assembly as claimed in claim 2, wherein said second unit is a ceiling-installed window or the like means, of transparent or opaque material, to be installed in an opening of a complementary shape formed in the ceiling of said building or the like structure.

4. The skylight assembly as claimed in claim 3, wherein said shaft means has a highly light reflective internal surface.

5. The skylight assembly as claimed in claim 4, including a source of power for said subsidiary illuminating means.

6. The skylight as claimed in claim 5, wherein said power source is one or more solar cells or batteries disposed externally on the roof of said building or the like structure.

7. The skylight assembly as claimed in claim 6, wherein said shaft means is of a rigid construction.

8. The skylight assembly as claimed in claim 7, wherein said shaft means is of flexible construction, being in the form of a cylinder or tube extending between said first and second units.

9. The skylight assembly as claimed in claim 8, wherein said shaft is in the form of a flexible walled tube having a coil spring fixed thereto to prevent transverse collapsing thereof and to permit

accordion-like expansion, contraction and/or bending thereof.

10. The skylight assembly as claimed in claim 9, wherein said tube comprises at least two plies cohesively joined and a coil spring is embedded therebetween.

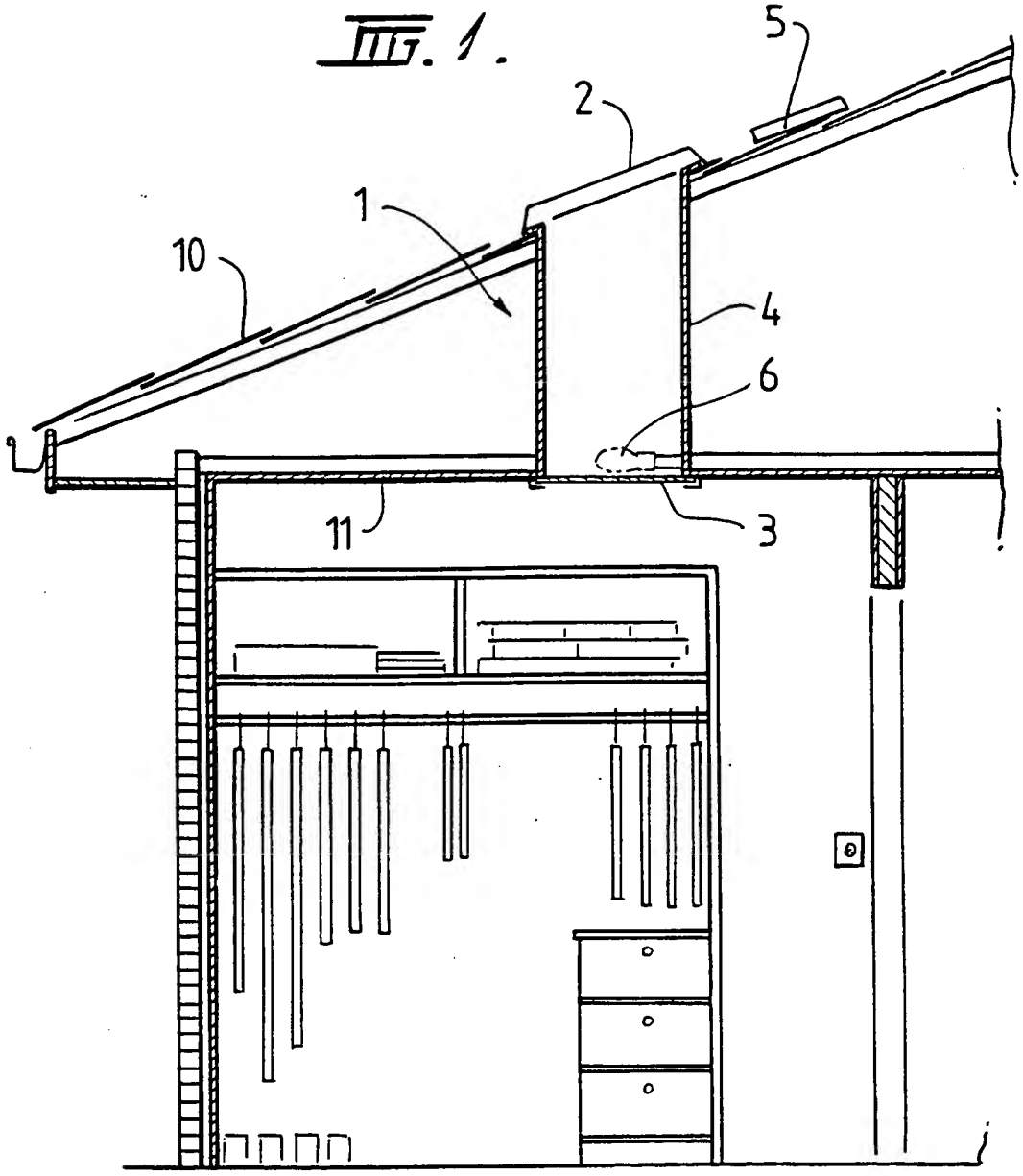
11. The skylight assembly as claimed in claim 10, wherein at least one of said plies is of a metallic material.

12. The skylight assembly as claimed in claim 11, wherein at least one of said plies is formed of a flexible plastics material.

13. The skylight assembly as claimed in claim 1, wherein said shaft means is formed from aluminised mylar.

14. The skylight assembly as claimed in claim 5, including a switch means for activating said power source for said subsidiary lighting means.

FIG. 1.



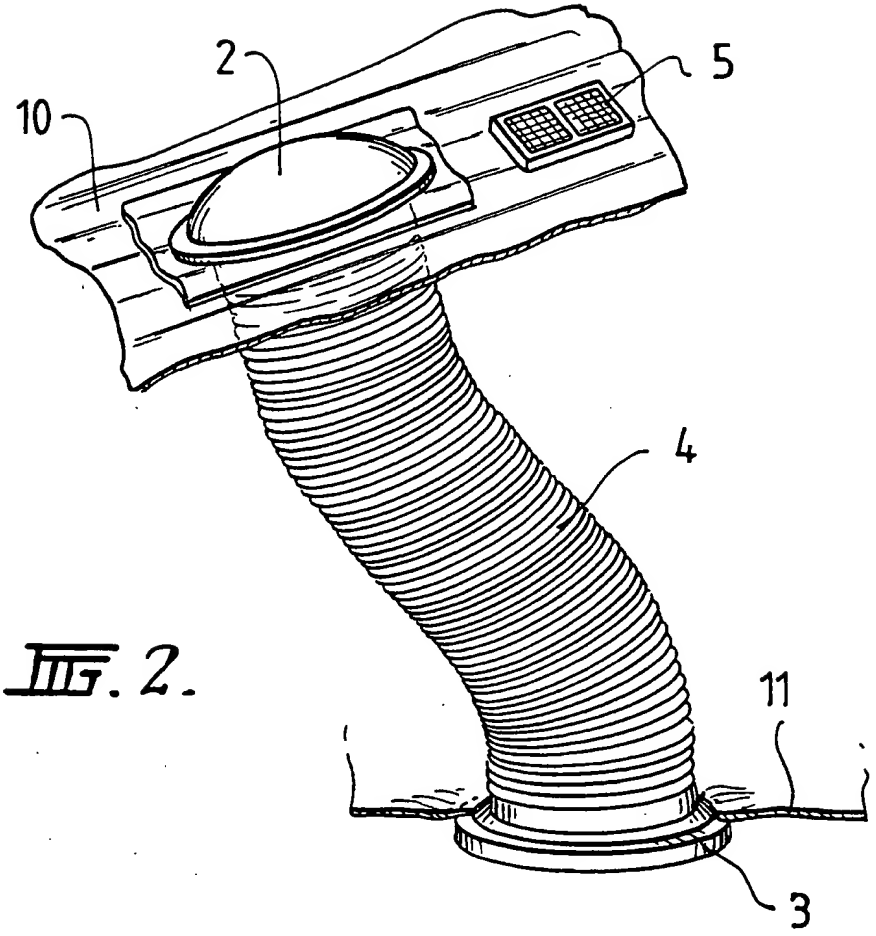
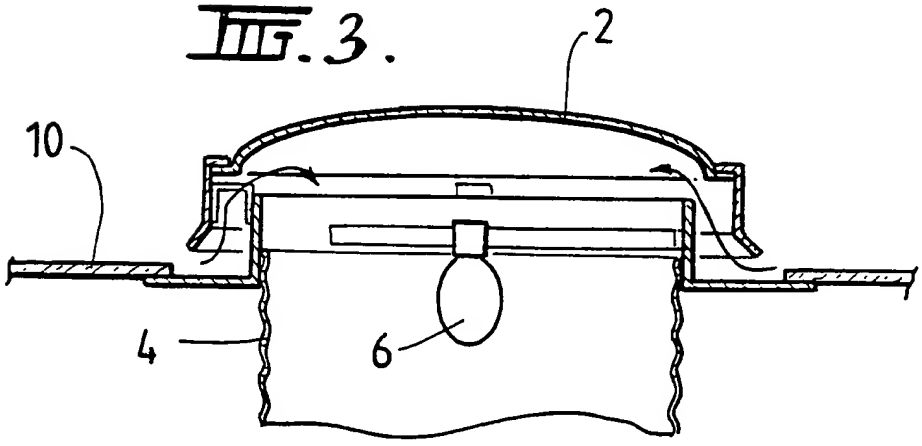


FIG. 2.

FIG. 3.



INTERNATIONAL SEARCH REPORT

International application No.
PCT/AU 93/00479

A. CLASSIFICATION OF SUBJECT MATTER
Int. Cl.[5] E04D 13/03 // F21M 5/02

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC: E04D 13/03, 13/035, F21M 5/02, F21S 11/00

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
AU: IPC as above

Electronic data base consulted during the international search (name of data base, and where practicable, search terms used)
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C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to Claim No.
	AU,B,66916/81 (542046) (WOODROFFE ROOFING PTY LTD) 23 July 1981 (23.07.81)	
X	see page 5, lines 29-32	1-7
Y	whole document	1-5,7-14
	US,A,4538218 (WATSON) 27 August 1985 (27.08.85)	
X	see column 2, lines 38-64	1-3
Y		4,5,7-14
	US,A,4339900 (FREEMAN) 20 July 1982 (20.07.82)	
Y	whole document	1-5,7-14

[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
20 December 1993 (20.12.93)	23 DEC 1993 (23.12.93)

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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate of the relevant passages	Relevant to Claim No.
X	US,A,3113728 (BOYD) 10 December 1963 (10.12.63) column 2, lines 14-28	1-3
X Y	CA,A,1220011 (VAN DAME) 7 April 1987 (07.04.87) page 3, lines 6-26 whole document	1-5,7 8-14

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report		Patent Family Member	
US	4538218	CA	1228392

END OF ANNEX